

ТРАЕКТОРИЯ НА РАННОТО РАЗВИТИЕ НА РАЗПОЗНАВАНЕТО НА ЛИЦЕВИ ЕМОЦИИ ПРИ ТИПИЧНО РАЗВИВАЩИ СЕ ДЕЦА

Иванка АСЕНОВА, Мария КУРТИ

Югозападен университет „Неофит Рилски“

БЪЛГАРИЯ, Благоевград 2700, ул. Иван Михайлов 66

asenova_iva@swu.bg; pre11093maria@gmail.com

Резюме. 118 деца на възраст от 3 г. и 10 м. до 4 г. и 4 м. и 118 деца на възраст от 5 г. и 11 м. до 6 г. и 3 м. са изследвани със задача за разпознаване на лицеви емоции (FERT) с цел проверка на хипотезата, че способностите за разпознаване на емоции се развиват през периода на предучилищната възраст. Тестът изискваше децата да разпознаят от фотографии лицевите емоционални експресии на шестте базисни емоции (гняв, тъга, страх, отвращение, изненада и щастие) след устното им назоваване от експериментатора една по една. Резултатите показаха значими различия в изпълнението на 3-4 годишните и 5-6-годишните типично развиващи се деца, което предполага подобряване с възрастта на точността на разпознаването на лицевите емоции като цяло, както и на точността на разпознаване за всяка отделна емоция, като най-значителна положителна промяна настъпва в точността на разпознаването на тъга и отвращение, а най-слаба – за щастие.

Ключови думи: разпознаване на лицеви емоции; предучилищна възраст; ранно развитие.

Статията да се цитира по следния начин:

Asenova, I., Kourti, M. (2021). Trajectory of Early Development of Facial Emotion Recognition in Typically Developing Children. *Psychological Research*, Volume 24, Number 2, 160-167. ISSN 1311-4700 (Print); ISSN 2367-9174 (Online).

© И. Асенова, М. Курти, 2021

Приноси на авторите в статията:

Иванка Асенова – резюме, въведение, теоретична постановка, методология, обсъждане, заключение.

Мария Курти – въведение, обработка на данните, резултати, използвана литература.

Статията е постъпила през май 2021
Приета за публикуване през юли 2021
Публикувана през септември 2021

Авторите са прочели и одобрили окончателния вариант на ръкописа.

TRAJECTORY OF EARLY DEVELOPMENT OF FACIAL EMOTION RECOGNITION IN TYPICALLY DEVELOPING CHILDREN

Ivanka ASENOVA, Maria KOURTI

South-West University "Neofit Rilski"

BULGARIA, Blagoevgrad 2700, Ivan Mihailov Str. 66

asenova_iva@swu.bg; pre11093maria@gmail.com

Abstract. 118 children ranging from 3 years and 10 months to 4 years and 4 months old and 118 children ranging from 5 years and 11 months to 6 years and 3 months old were studied with a Facial Emotion Recognition Task (FERT) with the aim to verify the hypothesis that emotion recognition abilities develop during the period of preschool age. The test required children to recognize the facial emotion expressions of the six basic emotions (anger, sadness, fear, disgust, surprise and happiness) based on naming them orally by the experimenter one by one. The results showed significant differences in the performance of facial emotion recognition task between 3-4 year old and 5-6 year old typically developing children, suggesting age-related improvement of the overall accuracy in facial emotion recognition, as well as of the recognition accuracy for all studied emotion categories, with significantly most prominent positive change for sadness and disgust, and the weakest change for happiness.

Keywords: facial emotion recognition; preschoolers; early development.

The article can be cited as follows:

Asenova, I., Kourti, M. (2021). Trajectory of Early Development of Facial Emotion Recognition in Typically Developing Children. *Psychological Research*, Volume 24, Number 2, 160-167. ISSN 1311-4700 (Print); ISSN 2367-9174 (Online).

© I. Asenova, M. Kourti, 2021

Ivanka Asenova – abstract, introduction, theoretical background, methodology, discussion, conclusion.

Maria Kourti – introduction, data processing, results, references.

Submitted – May 2021

Revised – July 2021

Published – September 2021

The authors have read and approved the final manuscript.

INTRODUCTION

Interacting with other people by understanding their emotional faces is a key social skill in human beings. However, the development of this skill during childhood and the brain processes underlying a child's perception of facial emotion are questions that are still not clear (Pollak & Sinha 2002: 784).

Without doubt, the development of emotional face perception starts from infancy and continues throughout life. Probably due to the suggestion that accurate identification of facial emotions is important for behavioral adaptation early in development (for a discussion see Grossmann 2010: 219), researchers have turned their attention to the subject of how emotion perception, and in particular emotional face perception, develops during the first years of life.

Studies aiming to examine the development of facial emotion recognition during infancy have evidenced that a few days after birth newborns already show a preference for some emotions and ability to discriminate them probably due to the knowledge gained from this short life experience (Farroni et al. 2007: 2).

In a review of previous research concerning the development of facial emotion processing abilities during infancy, Grossmann (2010: 220-222) summarized that the category of "happy face" is formed at the earliest, around the fifth months of age; the broader categories of emotional facial expressions are formed after seven months of age; the end of the first year of life is the period when children begin both to interpret others emotional facial expressions and to guide their behavior according to the emotional facial expressions of others in situations where they feel insecurity.

Developmental trajectory of recognition accuracy of facial expressions of emotions in pre-school age period is not well understood yet. For example, Gao and Maurer (2009: 503; 2010: 67) provided evidence that children demonstrate slow improvement in emotion recognition ability. Based on the results of two different studies conducted with three

groups of children: 5, 7 and 10 years old, the researchers found that five-year-olds had similar capacity as adults to recognize happy faces, but they confused fear, sadness and anger. The authors concluded that this capability grew with age, and children at the age of 10 had similar accuracy levels of identification of these emotions as adults.

Based on a review of the relevant studies' results, Gagnon, Gosselin and Maassarani (2014: 416) reported that children in preschool age recognized well happiness and sadness, but much harder identified other emotions, particularly fear and disgust, suggesting their much slower developmental pattern of recognition. The authors concluded that happy, sad and angry faces are identified at an earlier age than those expressing fear, disgust, and surprise.

Examining the ability of 3-year-old children to label facial emotion expressions Kujawa et al. (2014: 159) found that children at this age recognize most accurately happy faces, closely followed by angry faces; do not recognize as much sad, disgusted, and scared faces, and recognize most inaccurately ashamed and surprised faces.

Widen and Russell (2003: 114) studied 2-5 year old children's ability for free labeling of facial expression of six basic emotions and reported that the use of the label "happy" emerged earliest in this age period followed by the labels "angry", "sad", "scared", "surprised" and finally "disgusted".

Guarnera et al. (2015: 183) asked 6-7 year old children to identify emotional faces by using a labeling task and found that happiness is most accurately identified, closely followed by anger and disgust compared to fear, while surprise and sadness were most inaccurately identified.

Results of previous research suggests that the facial emotion recognition skills develop during preschool age period, but findings were inconsistent in terms of the developmental course of recognition accuracy of each basic emotion, except for happiness.

This study was designed with the aim to contribute to overcoming this inconsistency. In order to investigate early developmental

trajectory of the ability to recognize the six basic emotions in preschool age, typically developing 3-6 year old children were studied. We hypothesized that emotion recognition abilities improve during this age period but with a different developmental course for each basic emotion.

METHOD

Two groups of children of different ages - a younger children' group (3,10 - 4,4 year old) and an older children' group (5,11 - 6,3 year old), absolutely number- and gender-matched (118 children each, 56 boys and 62 girls), were asked to perform a facial emotion recognition task. The task required the recognition of six emotional faces with two neutral faces that were included "for noise". The set of photographs for this task consisted of 8 black and white photographs of adults (4 men and 4 women). Six of them presented one of the 6 basic emotional states: anger, sadness, fear, disgust, surprise and happiness, and the other two photographs presented one male and one female neutral faces.

All children participated voluntarily and with their parents' and the kindergartens' administration consent.

Before the start of the test, the experimenter informed the child that that they will now play a game in which the child must point to the picture that corresponds to the emotion word the experimenter said aloud. In addition, the examiner advised the child to look carefully at all the photographs before answering. Then, the experimenter placed all eight emotional photographs in front of the child and started the testing by asking the question:

"What do you think, who is sad/angry etc.?" No feedback on incorrect trials was provided for the task. No feedback was given on the correctness of the responses, but after each trial, the experimenter praised the response with phrases like: "Good answer", "You are good at this game".

The scoring of the task included the accuracy of performance. Each correct answer is scored 1 and each wrong answer - 0.

RESULTS

Results from the applied Independent-Samples T Test on the Mean task scores of the two age groups - the younger children group and the older children group, are presented in table 1.

As seen from the table, the average task scores of the two groups differed significantly ($t_{(234)} = -7.888, p < .000$), with the younger children group showing worse overall facial emotion recognition compared to the older children group. Therefore, the pattern of the received results confirmed the impact of the factor age on the effectiveness of the emotional face recognition in preschool children, with 5-6 year old children better recognizing facial expressions of basic emotions than 3-4 year old children.

The influence of age factor on the ability to recognize each basic emotion separately was examined by comparing the mean scores for each of the studied emotions of the two age groups. The results from the applied Independent-Sample T Test are presented in table 2.

As seen, the two age groups did not differ significantly regarding the recognition accuracy of anger, happiness, fear, and surprise

TABLE 1
MEAN TASK SCORES OF THE TWO AGE GROUPS

	N	Mean	Std. Deviation	Std. Error Mean
The younger children group	118	3.21	1.108	.102
The older children group	118	4.27	.948	.087
$t(p)$	$t_{(234)} = -7.888, p < .000$			

TABLE 2
MEAN TASK SCORES FOR EACH OF STUDIED EMOTIONS OF THE TWO AGE GROUPS

Anger					
	N	Mean	SD	Std. Error Mean	<i>t</i> (<i>p</i>)
The younger group	118	0.53	.500	.046	$t_{(234)} = -1.587,$ $p = .114$
The older group	118	0.63	.483	.044	
Happiness					
	N	Mean	SD	Std. Error Mean	<i>t</i> (<i>p</i>)
The younger group	118	0.86	.343	.031	$t_{(234)} = -1.020,$ $p = .309$
The older group	118	0.90	.291	.026	
Sadness					
	N	Mean	SD	Std. Error Mean	<i>t</i> (<i>p</i>)
The younger group	118	0.51	.502	.046	$t_{(234)} = -4.685,$ $p < .000$
The older group	118	0.79	.410	.037	
Fear					
	N	Mean	SD	Std. Error Mean	<i>t</i> (<i>p</i>)
The younger group	118	0.54	.500	.046	$t_{(234)} = -1.592,$ $p = .113$
The older group	118	0.64	.480	.044	
Disgust					
	N	Mean	SD	Std. Error Mean	<i>t</i> (<i>p</i>)
The younger group	118	0.39	.489	.045	$t_{(234)} = -5.076,$ $p < .000$
The older group	118	0.70	.458	.042	
Surprise					
	N	Mean	SD	Std. Error Mean	<i>t</i> (<i>p</i>)
The younger group	118	0.41	.494	.045	$t_{(234)} = -1.567,$ $p = .118$
The older group	118	0.51	.501	.046	

($p > .05$), but significantly differed regarding the recognition accuracy of sadness ($t_{(234)} = -4.685, p < .000$), and disgust ($t_{(234)} = -5.076, p < .000$).

It is noteworthy that regardless the size of the mean scores, the older children group demonstrated better effectiveness of the identification of all studied emotions in comparison to the younger children group.

Between-age group comparison of the ranking order of the six basic emotions in terms of difficulty to be recognized revealed that at a group level, the younger children most accurately recognized happiness and most incorrectly recognized disgust and surprise, and the older children most accurately recognized happiness and sadness, and most incorrectly recognized surprise and anger.

DISCUSSION

The aim of the present study was to contribute to better understanding of the developmental trajectory of the abilities to identify happiness, anger, fear, sadness, surprise and disgust in facial expressions during preschool age. By assessing children's performances in recognizing these emotions, we were interested to know whether 3-4 year old preschoolers differ from 5-6 year old preschoolers in their facial emotion recognition skills.

The results revealed significant differences in task performance between 3-4 year old and 5-6 year old typically developing preschoolers, suggesting age-related improvement of overall accuracy in facial emotion recognition during this age period. The same tendency of age-related improvement of recognition accuracy was found for all studied emotion categories, with significantly most prominent positive change for sadness and disgust, and weaker and insignificant changes for anger, fear, surprise, and especially for happiness.

This pattern of results indicates that the recognition of sad and disgusted faces in preschool age period follows a faster developmental trajectory, and the recognition of angry, scared and surprised faces, and especially happy faces, follows a slower developmental trajectory.

Our results are in line with previous research supporting the following suggestions: the capability to identify emotion in faces develops during preschool age period (Gagnon, Gosselin & Maassarani 2014: 416; Gao & Maurer 2009: 503; 2010: 67); the accuracy of perception of faces expressing negative emotions increases in preschool age (Durand et al. 2007: 14; Vicari et al. 2000: 836); children's abilities to identify different emotions in faces emerge at different times, with happiness being identified earliest among basic emotions (Widen & Russell 2003: 126-127).

CONCLUSION

To the best of our knowledge, this was the first research on the issue which was carried out in Greece. The received results evidenced

the development of facial emotion recognition abilities in typically developing preschool children 3-6 years old, suggesting a significant age-related improvement of overall accuracy in facial emotion recognition, as well as age-related improvement of recognition accuracy for all studied emotion categories, except happiness, with significantly most positive change for sadness and disgust.

REFERENCES

1. Durand, K., M. Gallay, A. Seigneuric, F. Robichon & J-Y. Baudouin (2007). The development of facial emotion recognition: The role of configural information. *Journal of Experimental Child Psychology*, 97, 14 – 27.
2. Farroni, T., T. Menon, S. Rigato & M. H. Johnson (2007). The perception of facial expressions in newborns. *Eur J Dev Psychol.*, 4(1), 2 – 13.
3. Gagnon, M., P. Gosselin & R. Maassarani (2014). Children's Ability to Recognize Emotions From Partial and Complete Facial Expressions, *The Journal of Genetic Psychology: Research and Theory on Human Development*, 175(5), 416 – 430.
4. Gao, X. & D. Maurer (2009). Influence of intensity on children's sensitivity to happy, sad, and fearful facial expressions. *Journal of Experimental Child Psychology*, 102, 503 – 521.
5. Gao, X. & D. Maurer (2010). A happy story: Developmental changes in children's sensitivity to facial expressions of varying intensities. *Journal of Experimental Child Psychology*, 107(2), 67 – 86.
6. Grossmann, T. (2010). The development of emotion perception in face and voice during infancy. *Restorative Neurology and Neuroscience*, 28, 219 – 236.
7. Guarnera, M., Z. Hichy, M. I. Cascio & S. Carrubba (2015). Facial Expressions and Ability to Recognize Emotions From Eyes or Mouth in Children. *Europe's Journal of Psychology*, 11(2), 183 – 196.
8. Kujawa, A., L. Dougherty, E. Durbin, R. Laptook, D. Torpey & D. N. Kleina (2014). Emotion Recognition in Preschool Children: Associations with Maternal Depression and Early Parenting. *Dev Psychopathol.*, 26(1), 159 – 170.
9. Pollak, S. D. & P. Sinha (2002). Effects of early experience on children's recognition of facial displays of emotion. *Developmental Psychology*, 38, 784 – 791.

10. **Vicari, S., J. Snitzer Reilly, P. Pasqualetti, A. Vizzotto & C. Caltagirone** (2000). Recognition of facial expressions of emotions in school-age children: The intersection of perceptual and semantic categories. *Acta Paediatrica*, 89, 836 – 845.
11. **Widen, S. C. & J. A. Russell** (2003). A closer look at preschoolers' freely produced labels for facial expressions. *Developmental Psychology*, 39(1), 114 – 128.

Prof. Ivanka ASENOVA, PhD
Maria KOURTI, PhD student
South-West University "Neofit Rilski"
BULGARIA, Blagoevgrad 2700, Ivan Mihailov Str. 66
asenova_iva@swu.bg; pre11093maria@gmail.com